



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

## THE STUDY OF MATHEMATICS UNDER THE INDIVIDUAL SYSTEM

By MARY M. REESE  
Skokie School, Winnetka, Ill.

About three years ago the system of individual instruction was introduced in the Winnetka schools by our superintendent, Dr. Carleton Washburne. This naturally had to be done gradually for after establishing definite goals for the work which must be accomplished in each grade, the material had to be prepared very carefully so that it would be as nearly self instructive as possible and the children could use it with a minimum amount of help from the teacher. Under this system a child progresses at his own rate of speed, neither being held back by slower pupils nor forced to go forward too rapidly for thorough understanding.

There is no subject, I believe, where there is such a difference in ability among pupils as in mathematics. Under the class instruction, many times children have reached the intermediate school with inadequate foundation in fundamentals because they were slow to grasp at least some process, but had to progress with the class.

Under the individual system a child cannot fail. He never repeats a grade although he may take more than a year to cover the work of that grade but the next year he commences where he left off. This time may be made up later if he has a good foundation. On the other hand many children are able to accomplish the year's work in less than the given time and if so are promoted to the next grade's work in that subject at once but they never skip a grade. A child does not change rooms each time he is promoted, the groups being changed usually once a year.

The arithmetic in all grades contains much practice work with answers so that the child can test himself. The preparation of these practice books has naturally been a big task. This has been done by all the teachers who are to use the books, their work being mimeographed and assembled into books which are given to the pupils as they need them. The work had to be taken up step by step with a quantity of practice work for each step. Each book is provided with answer sheets so that each child can correct his own work. Each lesson is followed by test corresponding with the work taken up in the lesson.

In the lower grades some of the development must be done orally but most of this work has been planned so that the children can understand it with a minimum amount of oral instruction. In the upper grades all of the work is developed in their practice books. If this is not understood by a pupil he has an opportunity to ask for further assistance. When he feels he is ready, he takes a test on the new step. This test is corrected by the teacher.

In the intermediate school, if he makes any error in his test, he corrects mistakes, takes more practice work if his test shows need of it, and takes a second test, and if necessary, a third test.

There is necessarily some bookkeeping in connection with this work so that a teacher may know at any time where each pupil stands but usually only a record is kept of correct tests.

On the other hand all the practice work is corrected by the children themselves and not every child hands in tests every day, making fewer papers for the teacher to correct than under the class system. At the end of the month a goal book is sent home for parents inspection and signature. This book contains a list of all the goals which must be reached for that grade, and shows how far the child has progressed toward the achievement of these goals. If he is promoted in any subject he is given the goal book for the next higher grade.

The arithmetic pages of the seventh and eighth grades are given below. On the fundamental page, "speed" means the number of examples of standard difficulty worked in three minutes; "accuracy" is the percent correct.

SEVENTH GRADE, ARITHMETIC FUNDAMENTALS—GOALS

Addition Review	-----Sp.	6.	Acc.	100	per cent	-----	-----
Subtraction Review	-----Sp.	12	Acc.	100	per cent	-----	-----
Simple Multiplication	-----Sp.	3	Acc.	100	per cent	-----	-----
Compound Multiplication	-----Sp.	2	Acc.	100	per cent	-----	-----
Long Division	-----Sp.	2	Acc.	100	per cent	-----	-----
Fractions	-----Sp.	4	Acc.	100	per cent	-----	-----
Decimals	-----Sp.	4	Acc.	100	per cent	-----	-----

Course Begun-----192-----

Promoted to Grade 8 Arithmetic Fundamentals-----192-----,

-----  
Teacher.

## SEVENTH GRADE ARITHMETIC GOALS

## EXPLANATION:

In the Seventh Grade, Parts I and II are essential for promotion to Grade 8 in Arithmetic. This is in addition to work in fundamentals, the goals of which are given on the preceding page. The advanced part is to be completed as far as possible.

	Oct.	Nov.	Dec.	Jan.	Feb.	Mch.	Apr.	May	June
Self-Reliance									
Diligence									
Deportment									

In the seventh grade, the required work is divided into two parts; the first includes application of percentage such as profit and loss, discount, commission and interest, and the second part is work in mensuration. In this section of required work are the subjects in mensuration which are essential to every child, even if they leave school at the minimum age.

In addition to the required work mentioned above, a general review of all fundamental operations is required. To receive an O. K. in any operation the pupil has to work accurately a given number of problems in three minutes. If he makes any error, he has to take additional practice work and tests until the required goal is obtained.

The individual work covers the minimum amount of work which must be accomplished for promotion to a higher grade but there is much social work done in all the grades. This work supplies the life and the co-operation among the pupils that is lacking to a certain extent in their individual work. As arithmetic is more of a drill subject and more easily adapted to individual work those other subjects, much of the social work is found in other studies. From one-third to one-half of the pupils' time is occupied by this social work which is an important part of their curriculum; although their marks and promotions are based entirely on their individual work.

In the eighth grade, however, the work, although outlined for individual work and followed by tests on the essential points for which each one is held responsible is mostly developed by dis-

cussions or by some form of social work. The required work in this grade is composed mostly of business subjects. The topics themselves are more important than the examples usually presented in connection with them. How many of us ever learned very much about insurance, taxes, stocks and bonds from the numerous examples we worked? It is our aim in the eighth grade so to vitalize these subjects that they have a real meaning to the boys and girls. Not that they will have a comprehensive

SEVENTH GRADE ARITHMETIC GOALS

Part I—Percentage Application		4. Circles	
1. Percentage Review	-----	Comparison of Diameter, Radius and Circumference— Test 6----- Test 7----- Test 8----- Test 9----- Test 10----- Review Test-----	-----
2. Profit and Loss	-----		-----
a. Finding Gain: Cost and rate given—Test 1-----	-----		-----
Test 2-----	-----		-----
b. Finding Loss: Cost and rate given—Test 3-----	-----		-----
c. Finding per cent of Profit or loss—Test 4-----	-----		-----
Test 5-----	-----		-----
3. Commission	-----		-----
4. Discounts	-----		-----
5. Interest and Amt. for years—Test 8-----	-----		-----
6. Interest and Amount for yr. and mo.—Test 9-----	-----		-----
Review Test-----	-----		-----
Part II—Mensuration		ADVANCED	
1. Review of Long Measure—Test 1-----	-----	Area of Triangles—Test 1-----	-----
2. Square Measure—An acre of land—Test 2-----	-----	Area of Circles—Test 2-----	-----
3. Volume of Rectangular Prism	-----	Volume of Cylinders—Test 3-----	-----
Test 3-----	-----	Short Cuts in Multiplication	-----
Test 4-----	-----	Test 4-----	-----
Test 5-----	-----	Test 5-----	-----
	-----	Test 6-----	-----
	-----	Short Cuts in Division	-----
	-----	Test 7-----	-----
	-----	Test 8-----	-----
Course Begun-----192-----			
Promoted to Grade 8 Arithmetic-----192-----			
			Teacher-----

knowledge of business, but they will get enough to lay a foundation for more as the needs arise and to have an understanding of business terms which they will hear and of which they will read.

The children are taught banking by running an imaginary bank. They all receive check books which are printed in the school print shop by the boys and, following directions found in their practice books, they make out checks to each other and fill

EIGHTH GRADE ARITHMETIC GOALS

I. BUSINESS FORMS

1. Bills -----	2. Stock -----
2. Receipts -----	3. Bonds -----
3. Cash Accounts -----	Review—Factoring -----
<i>Banking</i>	II. ADVANCED
1. Checking Accounts -----	1. Square Root—Test 1-----
2. Savings Accounts -----	Test 2-----
<i>Real Estate</i>	Test 3-----
1. Buying and Leasing-----	Test 4-----
2. Mortgages and Notes-----	Test 5-----
3. Bank Discount -----	2. Hypotenuse of Right Triangles-----
<i>Insurance</i>	3. Use of the Formula—
1. Fire Insurance -----	Test 1-----
2. Life Insurance -----	Test 2-----
<i>Taxes</i>	Test 3-----
1. Local Taxes -----	4. Use of the Equation—
2. National Taxes -----	Test 1-----
<i>Stocks and Bonds</i>	Test 2-----
1. Organization of corporation-----	Test 3-----
	Test 4-----

Date Begun.....192.....

Work Completed.....192.....

Teacher

out the stubs in their books. The checks received are endorsed according to directions and with deposit slips made out are deposited in the bank, the children taking turns as tellers. If any error is made the check has to be rewritten. After all the required checks are written correctly and deposited, they balance their accounts and take a test which covers the essentials. If any mistake is made they take a second test.

They have studied stocks and bonds by forming a stock company. They appoint incorporators who, after deciding on the amount of capital stock and the cost a share, solicit stock from other members of the class, which is paid for by check. Meetings are held at which directors and officers are elected and the subject studied learning the meaning of preferred and common stock and other important terms used. At the end of the first imaginary year, dividends are declared, the children receiving their dividends in checks made out by treasurer. The corporation then borrowed money by issuing bonds.

This year the plan was changed somewhat. A real corporation was formed with capital stock amounting to \$300, the incorporators selling shares of preferred stock yielding 7% interest at 10 cents a share, in lots of from one to fifty shares, to not only the eighth grade but to lower grades, parents and teachers. Up to date about \$250 has been paid into the treasury by subscribers who have received regular certificates with the seal of the corporation. At the end of the first month, business being prosperous a quarterly dividend of 2% was declared, each stock holder holding five or more shares receiving his pennies from the treasurer.

This company, known as the Skokie Finance Corporation has under its control the school paper which is edited and printed by the boys in the school shop. It also runs a very active school store which sells school supplies to the pupils. It expects to control other enterprises that arise. All bills are paid by checks made out by the treasurer and countersigned by either manual training or mathematics teacher.

The store is operated by children who are so far advanced in their work that they have extra time. These children are taught simple accounting and are keeping a set of books in connection with this work.

Next year we hope to continue this work, issuing bonds and enlarging its usefulness.

In addition to the essentials which must be achieved by the child, in both the seventh and eighth grades an advanced course in mathematics is prepared for those who finish the essential part of the work before the close of the year. This is entirely individual and the child works as far as he individually is able. As the essential part is expected of the slowest, the majority will do some of the advanced work and many finish all of it. As the eighth grade advanced work is designed as a help to high school mathematics, the children are urged to work as much as possible of this if they are up to standard in their other studies.

The attempt has been made to fit the work to the needs of the children and not fit the children to the course prepared.